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Adaptation of Folk Medicines in the Formal *Materia Medica* of Classical Antiquity

by John Scarborough

Aristophilus of Plataea, from that famous site among us Athenians for the battle against the Persians which finally drove the barbarians from Greece almost 200 years ago, is once again the subject of juicy gossip in the agora: as a pharmakopōlēs ("drug vendor"), Aristophilus has devised an ingenious manner to keep his overly-randy male slaves in check. It is said that he doses his amorous slaves with a drug that ensures their lack of interest in some recently purchased females from southern Russia (their flaxen hair appears to inflame the male beyond all reason); moreover, so the same travelers from Plataea are saying, Aristophilus has threatened his slaves with permanent impotence, if they do not pay closer attention to their duties on the farm and in the rather richly furnished household of the wealthy druggist. Malicious rumor also regales us with Aristophilus' worried concern about what his slaves might do with his own wife, who is known far and wide in central Greece as a woman as fair as Homer's Helen of Troy. But there is even more to this titillating story, making the rounds in the Athenian marketplace, as the great teacher of philosophy and botany, Theophrastus of Eresus, is wending his way from the famous covered portico, where he has just finished his weekly lecture on the medicinal properties of some plants: Aristophilus claims that his anaphrodisiac drug also has the property to enhance one's interest in intercourse. But we know–many of us are ex-farmers or sons of ex-farmers–that the common orchis[1] can have these opposite results; thus why is everyone so intrigued by this tale of Aristophilus' drug? After all, if someone feeds his wife the larger bulb of an orchis prepared in the milk of a mountain-pastured goat, she will become not only extremely erotic and passionate but she will also be able to conceive more easily. Maybe Aristophilus' pharmakon is not anything new, in spite of all the popular hubbub among the gossips here in Athens. . . .

APHRODISIACS and anaphrodisiacs have engendered interest since the beginning of history,[2] and the semi-fictionalized account above is based on some passages in Theophrastus' *Enquiry into Plants*, IX, 18. 3-6.[3] *Enquiry*, IX, 18, is replete with data on the *orchis*,[4] and several other plants associated with fertility and infertility,[5] aspects termed by Preus "psychosomatic" at best.[6] Theophrastus (c. 270-388 B.C.) is not quoting from his usual "folk source," the *rhizotomoi* (rootcutters),[7] but from unnamed informants, and the Greek text shows we should re-

AIHP Reprint Series: Out-of-Print publication *Folklore and Folk Medicines*, ed. John Scarborough (Madison, WI: American Institute of the History of Pharmacy, 1987), pp. 21-32.

gard this information as "common knowledge," perhaps excepting the specific citation of Aristophilus of Plataea. Moreover, continues Theophrastus,

> there are drugs [*pharmaka*] which engender the conception of either a male or a female, and thus they say [*kalousi*] that one kind of plant is male-producing, the other female-producing; and both look like basil [*ōkimon*].[8] To make the semen unfertile, one administers the fruit of the white ivy, but to make it fertile, the fruit of the willow weed in water is given.[9] They also say that if someone takes for thirty days the fruit of the honeysuckle steeped in wine in the dosage of one *choinix* [about a quart] a day, he will become unable to have an erection; at the end of the treatment, total impotence is the result.[10]

Each plant suggested here in this curious section of *Enquiry to Plants* can be paralleled by the specifics in the drug lore of other Greek texts,[11] but Theophrastus now adds another "source" to his collection of materials on sexually useful pharmaceuticals: a tale from India, which is included at third-hand, since neither a name of an author nor the name of this erection-stimulant is specified: "Most marvelous is a plant possessed by an Indian who did not eat it but spread it on his organ so that he had the power to have intercourse as many times as he wished . . . women experience very great arousal when they use this drug."[12] Then our careful author, Theophrastus, writes, "if true, this drug [*pharmakon*] has a special property [*dynamis*]." Even if one is tempted to dismiss these bits of common knowledge and quasi-folklore as the fourth century B.C. Greek equivalent of male fantasies, a quick check of the famous *Kama Sutra* by Vatsyayana indicates that Indian drug lore encompassed a number of pharmaceuticals purported to increase sexual capacity.

In the instance of aphrodisiacs, one cannot presume a usefulness or a lack of it, as one generally can with most other drugs listed in ancient pharmacological handbooks, simply because sexual stimulants by whatever brand or origin soon became encrusted with extraneous details of religious or other associations that tend to obscure data on actual potency.[13] This does not mean, however, that such data as one finds on aphrodisiacs in Greek pharmacy are any less sophisticated than other drugs, and the modern observer needs to become aware of a long-standing prudishness—neatly demonstrated by Hart's omission of these passages from his 1916 translation of Theophrastus—now subtly disguised by newer designations including "confused and irrelevant" or "textual corruptions."[14] Passages such as *Enquiry*, IX, 18, suggest not only the universal quest for true aphrodisiacs but also that Greek society was not overly concerned about matters of pure sex (it had its own, different hangups),[15] and we can, therefore, discern a careful consideration by Theophrastus of his unnamed sources, as well as Aristophilus of Plataea, whose anaphrodisiac treatment of slaves must have caused something of a stir in central Greece a generation or so before the composition of *Enquiry into Plants*.[16] By expanding his sources beyond the ordinarily employed *rhizotomoi*, Theophrastus has acknowledged the importance of drug lore even further removed from the professionals of his day, and this drug lore is revealed as detailed, sophisticated, and just as valid as the roots, herbs, seeds, and stems of the rootcutters. Furthermore, Theophrastus had made note that many of the *rhizotomoi* were "specialists" (in, e.g., hellebore, mandrake, etc., alone),[17] while many of his less "professional" sources for drugs and pharmaceuticals as they emerged from the world of plants would range more widely.

Another kind of adaptation of folklore on drugs is perceived in the data on medical entomology and herpetology, recorded by Nicander of Colophon (*fl. c.* 140 B.C.) in his two extant poems,[18] the *Theriaca* and *Alexipharmaca*.[19] Much of what one reads about the black widow spiders, various cobras, millipedes and centipedes, scorpions, and even blister beetles,[20] is clearly filtered information passed along by farmers into the formal lore on zoology and entomology, written down perhaps a generation after Aristotle.[21] Farmers and agricultural workers experienced first-hand the troublesome problems of snakes, spiders, and scorpions in the fields, and many of the recipes listed by Nicander are those which appear in an apparently hoary tradition of effective folk medicines, still employed as the recipes in the Byzantine farm manual of the tenth century we call the *Geoponica*.[22] Farmers, of course, do not write much, but they are keenly interested in any data which would allow them greater yields in their crops and would be particularly attentive to valid traditions which gave them precise instructions on plowing, planting, weeding, and harvesting. Not surprisingly, the

first surviving poem in Greek (after Homer's two epics) is a farm manual called *Works and Days* by a very disgruntled farmer named Hesiod of Ascra (*fl. c.* 700 B.C.);[23] *Works and Days* is basically an early version of a "farmer's almanac," and one can see how such manuals would add data as the centuries passed. Nicander, the city-bred poet of Colophon, certainly did not comprehend the deep traditions he chose to record in some of the most quirky hexameters which have survived in Greek, but the bare outlines of his information show quite explicitly what farmers worried about and what they did with the continual problems of farm-hands' wounds from the denizens of the fields. Moreover, an analysis of various remedies prescribed by Nicander and his sources shows a deep sophistication and an apparently long-term employment of known drugs; quaffing too much *kantharis* (a solution made from blister beetles, known in certain levels of modern folklore as "Spanish fly")[24] was treated with kaolin, and snake bites and scorpion stings received some rather sensible (by modern standards) remedies.[25]

Yet Nicander's two poems epitomize another important adaptation of folk medical drugs as antidotes against poisons and the bites and stings of poisonous creatures: the form in which Nicander cast the thousands of varied facts—that is the hexameter poem, the same six-foot line characteristic of the finest Greek poetry since Homer—allowed the would-be toxicologist to memorize the disparate details quite easily; the *Theriaca* and *Alexipharmaca* thereby became the encapsulated encyclopedia for toxicology in the centuries when all "books" were composed on papyrus rolls,[26] and these "books" had a very short life-span, attested by the thousands of "scrap papyri" uncovered at Oxyrhynchus in Egypt and elsewhere.[27] Much as one finds in the modern Middle East many quite learned scholars who have committed to memory hundreds of books (beginning with the difficult lines of the Koran),[28] one also can comprehend why medical poetry would make sound sense in an era before the invention of the codex (our book).[29] Rural data on toxic substances would be known in their oral forms over many generations, and if one compares medieval Syriac traditions on herbs and herballore[30] with modern analogues in Jordan and Syria, one notes the basic accuracy of information preserved orally, in spite of a pervasive, modern western assumption that real accuracy results only from preservation in written documents. This technical aspect of oral transmission is important when one considers what might be "taken for granted" by the compilers of the magical works we call collectively the *Papyri Graecae Magicae*,[31] especially in terms of "brand names" that would indicate well-known formulas and multiple ingredients. It is, therefore, not surprising that Nicander's easily memorized poems became the reference for medical entomology and toxicology from late Hellenistic times until the European Renaissance.[32] To be sure, many of the exotic substances required added commentary, and our manuscripts do have quite a body of these marginal scholia,[33] but this does not detract from the basic value of the form presented in hexameters. Nicander's major source, Apollodorus (*fl. ?* 250 B.C.),[34] most likely had assembled his work into a standard prose format in the manner of the *historiai* ("inquiries") of Aristotle and his school, and the "data bank" for Apollodorus probably was the farm lore of Asia Minor and Egypt. Apollodorus' original tract on poisonous animals has not survived except for fragmentary quotations in later writers. Medical poetry enjoyed a long popularity (e.g., the "Theriac poems" by Damocrates, as quoted by Galen),[35] and faded from view only after the codex became firmly favored as the produced form of a book.

When we reach the work of Dioscorides of Anazarbus (*fl. c.* A.D. 65), we are faced with a different set of questions regarding adaptation of folk medicines into a presumably more formal level of learned medicine: John Riddle's splendid monograph now provides details on Dioscorides' marvelous skills as a botanist and pharmacologist, as well as his shrewd assessment of drug actions,[36] but his methodologies for judging folklore deserve close attention. To Dioscorides, the practicing physician and medical botanist, there were several kinds of folklore, and each demanded a separate approach: among the most important sources of folk remedies were those purported to be very old, indeed, and which came to Dioscorides in written form, especially in Egypt (e.g., the *kyphi* recipe in Book I of Dioscorides' *Materia medica*);[37] these records of an ancient medical and pharmacological tradition would be selected carefully, explaining why Dioscorides reproduces only one *kyphi* rec-

ipe from the Egyptian texts (presumably translated into Greek) he has seen. Dioscorides would also "hear things" from local sources on his travels, and a clear manner of classifying such oral sources–after he had verified them or found them to be false–would be to set them down as connected with specific geographical areas; thus one finds Dioscorides' *Materia medica* replete with drugs and herbs carefully identified with Egyptian lore, or that of Greece, or various provinces of Roman Asia Minor, or with Greek Cyrene (modern coastal Libya) in the case of the famous cure-all of classical antiquity, *silphion*.[38] Did Dioscorides believe that one ethnic tradition was more trustworthy than another? Analysis of Dioscorides' Greek texts, now buttressed by Riddle's perceptive concept of Dioscorides' "drug affinity system,"[39] strongly indicates that Dioscorides did not favor one culture over another. And it is not insignificant that Dioscorides' view of the written work on pharmacy and pharmacology before his day (nicely summarized in his Preface to the *Materia medica*) shows he trusted those "authorities" even less than he might those oral sources he uncovered in his extensive travels in the eastern half of the Roman Empire: reliance on "book learning" was dangerous, so Dioscorides taught,[40] a warning ignored by Galen.

Among the hundreds of examples suggesting Dioscorides' use of folklore as he compiled the information which became his *Materia medica*, the following is chosen at random as illustrative of his sense of judgement as well as his shrewd respect for the folk medicines in various oral traditions. This is Dioscorides' account of *apsinthion* (wormwood: *Artemisia* spp.), which he says is a "well-known herb" [gnōrimos hē poa]:[41]

> A wine is made [with wormwood] which is called *apsinthitēs*, especially in the Propontis region and in Thrace [across the Bosphorus], which they employ in ailments listed above [stomach pains, bad mushrooms, as emmenagogues, and several other digestive complaints], as long as there is no fever present. They also toast one another with this wine during the summer, believing it to be a promoter of good health. It also seems [dokei de kai] that they place *apsinthion* in their clothes boxes to guard against their garments from being eaten up [? by insects], and they also use it with oil, anointing themselves so as to prevent mosquitoes from biting the body. And macerating *apsinthion* with the ink with which we write prevents mice from eating that which we have written [*ta grammata*], but it seems that the juice [*chylismos*] of wormwood works just as well for this purpose. However, I do not condone the use of wormwood in drinks since it is harmful to the upper digestive tract and causes headaches. The juice of wormwood is counterfeited by boiling and mixing olive-water [*amorgē*].[42]

Folklore is prominent throughout these passages, as it is in many other sections of the *Materia medica,* and Dioscorides' methods of judgment and analysis generally follow the pattern seen here in his considerations of wormwood. First, he gives us the specific name of the medicinal wormwood-wine as it is known in northwestern Asia Minor and in Thrace, and then he says that, in common with its usual employment elsewhere for various stomach ailments, these peoples use wormwood-wine only when there is no fever as part of the illnesses. The text also shows that Dioscorides had witnessed some Thracians drinking wormwood-wine in the summer, but the following lines indicate he is reporting what someone had told him about wormwood's use as an insect repellant in clothing chests and as a mosquito repellant. On the other hand, the folklore of wormwood in ink to prevent mouse-eaten manuscripts is a fact verified by Dioscorides, and he says that the juice works just as well on its own. After all this, he writes he would not use wormwood in drinks, even though his folk sources say it would be beneficial, and then Dioscorides indicates how widely used was this wormwood-wine, since only valued drugs would be faked as is this particular wormwood juice. A fascinating amalgam in a very short compass, few wasted words, and a succinct combination of good pharmacy and careful assessment of folklore about wormwood.

The adaptation of folk medicines by Galen of Pergamon (A.D. 129-after 210)[43] is a curious combination of written sources and attribution of non-professional concoctions, suggesting more about Galen's own methodology in drug lore than about his use of pharmaceuticals. After inveighing noisily about how one had to learn medical plants and drugs from a skilled and experienced teacher,[44] he proceeds to fill many pages with a confused and confusing pharmacological doxography:[45] most of "Galen's" drugs are taken verbatim from the compilations of pharmacy by Andromachus (physician in the time of Nero [A.D. 54-68]),[46] Criton (physician to the emperor Trajan [A.D. 98-117])[47] and a few other earlier authors on pharmaceuticals,[48]

and the folkloristic drugs are contained within these previously collected listings of authors and sources.[49] A seemingly humorous pharmaceutical folklore flows from the pages of Galen as he quotes from the recipes of Celer the Centurion,[50] Diogas the Trainer, Euschemus the Boxer, Flavius the Boxer, Orion the Groom, Pharmaces the Rootcutter of Persia, Philoxenus the Schoolmaster, and Simmias the Crowd-Puller. An important recipe, quoted by Galen from the works of Criton, was called "The Paris," after an actor who had invented a particularly nasty but effective hair remover.[51] Thus the huge number of details provided by Galen and his sources are a composite of a pharmaceutical folklore of urban life in Greco-Roman culture, a folklore somewhat removed from the rural settings of the pharmacy of Theophrastus, Nicander, and Dioscorides. In some respects, a careful study of Galen's pharmacological doxography might reveal not only some fascinating aspects of how pharmaceuticals were prepared and compounded in the sleazy quarters of various cities in the Roman Empire (the quintessentially seamy locale for drug vending in the Roman world was the *Seplasia* in Capua),[52] or where the traditionally mistrusted *Marsi* (viz. "snake charmers")[53] would live and hawk their cure-alls. While quoting with great respect authors such as Dioscorides,[54] it appears that Galen failed to distinguish between valid pharmacological data in his written sources on materia medica and the curiously concocted and wildly useless compounds touted by the *Marsi* and such as Orion the Groom. One wonders about Simmias the Crowd-Puller. . . .

Finally one must turn briefly to the texts of Greco-Roman antiquity which clearly emerge from levels of society other than those of learned physicians and pharmacologists. Often forgotten in the consideration of mores in classical antiquity is the rather rigid separation of well-born from titleless families, between rich and poor, a gulf which widened in the centuries of the Roman Empire, even though Roman law espoused an equal treatment of all citizens (the key, of course, is who was a citizen and who was not).[55] Yet many of the so-called lower classes were reasonably literate, as evinced by the famous graffiti of Pompeii,[56] and the numberless scribblings on the papyri (Greek, Latin, and Coptic) from Hellenistic, Roman, and Byzantine Egypt.[57] And also quite often ignored by modern scholars—in a deliberate fashion—is the common and ordinary belief in magic and astrology which pervaded all strata of society among the ancient Greeks and Romans,[58] as well as the normal assumption by Greek and Roman savants that the study of these two subjects was as valid as mastery of mathematics, or medicine, or philosophy. Even the great polymathic rationalist Galen firmly believed that medical astrology provided one of the surest methods for diagnostics,[59] and he has left us sufficient evidence to show he was well acquainted with the quasi-magical and mystical corpus of material under the name of Hermes Trismegistus, as well as Egyptian learning in medical magic and astrology.[60] One needs only to consider the medical and herbal lore of Thessalus of Tralles (*fl.*? in the reign of Claudius [A.D. 41-54]), revealed as part of a widely popular literature of Hermetic and astrological lore,[61] presumably a fusion of very ancient Egyptian knowledge and the more modern late Hellenistic information on herbal remedies.[62] This is an aspect of medical folklore loaded with the proverbial scholarly minefields, since modern value systems in science clash so radically with scientific values in antiquity, a point recently emphasized by Geoffrey Lloyd in his Cambridge Inaugural Lecture of March 1985.[63]

One facet of this magico-medical folklore, as it relates to Greco-Roman pharmacy, is the collection of texts in Greek and Coptic called the *Papyri Graecae Magicae*,[64] which generally date from Roman and Byzantine Egypt (c. 30 B.C. to about A.D. 640). One can also draw similar details from the larger number of Greek texts in the *Catalogus Codicum Astrologorum Graecorum*,[65] but like analogous collections of alchemical tracts in Greek, the *Catalogus* materials include works ranging more widely in time, from the early Roman Empire through the last century of the Byzantine Empire. A third body of literature within this pseudo-scholarly class is the assembly of Greek and Latin texts in the *Corpus Hermeticum*, which is dominated by a fluid and vague pseudo-philosophic jumbling of pagan theology with the jargon of Greco-Roman astrology and an amalgam of Greco-Egyptian religion.[66] Among the intertwinings between Hermetic tracts and those classed as astrological, one occasionally finds named authorities and the oddly exact herbal lore of the writings of Thessalus of Tralles is curiously tinged with

Hermetic doctrine.[67] Compared to the Hermetic works, the texts in the *Papyri Graecae Magicae* and the *Catalogus* are spare tracts, directly aimed at particular results, and the *Papyri Graecae Magicae* especially illustrate a drug lore "taken for granted" apparently by both the unknown compilers of the spells and incantations and by those who might chance to read them or attempt to use them. A particular example of the kind of medicinal folklore from pseudo-learned levels which penetrated into and was accepted by formal pharmacy in the Roman and early Byzantine Empire is the *kyphi*, a multi-ingredient incense.[68] Our first indication of this substance comes from Pharaonic Egypt,[69] and Manetho wrote a tract on its manufacture in Greek c. 200 B.C.[70] at about the same time as he wrote a basic history of Egypt in Greek (based upon Egyptian sources) to educate the Greek rulers of Egypt concerning the very old traditions of dynastic Egypt, long before the arrival of Alexander the Great.[71] Dioscorides provides one recipe for a *kyphi*,[72] but the *Papyri Graecae Magicae* merely give its name,[73] as if it is a commonly known substance. Were it not for the formulas for *kyphi* given by Dioscorides, Plutarch,[74] Damocrates as quoted by Galen,[75] Oribasius (*fl.* c. A.D. 325-400),[76] and Paul of Aegina (fl. c. 640 in Alexandria),[77] one would be reduced to learned speculation about what this "salve-incense" was, an ointment-incense which was also edible. Dioscorides was one of the first physicians and pharmacologists to recognize the practical usefulness of the traditional Egyptian multi-ingredient incense recipes, and by the time Paul of Aegina included a twenty-eight-ingredient "lunar *kyphi*" in the formal pharmacy of early Byzantine pharmacology, the quasi-folkloric *kyphi* held a place between those drugs prepared as lozenges to be dissolved in the mouth, and those drugs believed to be true antidotes.[78]

Folk medicine quite frequently became part of learned medicine and pharmacy, as suggested by Theophrastus' *rhizotomoi*, Dioscorides' oral informants on locally employed *pharmaka*, and the historical development and augmentation of the *kyphi* recipes from Dynastic Egypt· through the pharmacology of Paul of Aegina in the seventh century. Dioscorides' *Materia medica* vividly illustrates the long-term process of how folk medicine and popular drug lore became incorporated into the formal and learned medicine of classical antiquity: herbal remedies were portions of local customs and traditions having venerated pedigrees, and if an independent observer could verify particular usefulness in drug lore, such locally employed pharmaceuticals became part of a wider medicine.

Notes

1. Probably the pink butterfly orchid (*Orchis papilionacea* L.), used in the folk medicine of the eastern Mediterranean as an aphrodisiac, demulcent, and nutritive powder. Oleg Polunin, *Flowers of Europe* (London, 1969), 575 [No. 1884]. George Usher, *A Dictionary of Plants Used by Man* (London, 1974), 426.
2. The twentieth century continues to produce hopeful studies of these venerable substances, and two monographs illustrate this modern genre: Alan Hull Walton, *Aphrodisiacs* (Westport, Conn., 1958), and Peter V. Taberner, *Aphrodisiacs* (Philadelphia, 1985). Of the two, Taberner is less satisfying as an historical study and exhibits woeful sloppiness in citation of sources, while Walton is generally a lengthy preachment for good nutrition (which yields good sex).
3. Due to an excess of Victorian prudery, A. Hort's edited Greek text and English translation of Theophrastus, *Enquiry into Plants* (London, 1916; 2 vols [Loeb Classical Library]) omits both the Greek and English of *Enquiry*, IX, 18. 3-11. One must, therefore, use the Greek text (with Latin translation) of F. Wimmer, ed., *Theophrasti Eresii opera* (Paris, 1866; rptd. Frankfurt am Main, 1964), pp. 159-161. An English translation rendered from Wimmer's Greek text exists: Chalmers L. Gemmill, "The Missing Passage in Hort's Translation of Theophrastus," *Bulletin of the New York Academy of Medicine* 49 (1973): 127-129.
4 Theophrastus' sources had provided him with the name of this tubered flower of Greece, which has the usual characteristics of having last year's bulb shrink and this year's bulb enlarge; *Orchis papilionacea* L. (n. 1) is the most common of Greek orchids, and Theophrastus' mention is the first in western literature. O. Ames, "The Origin of the Term Orchis," *American Orchid Society Bulletin* 11 (1942): 146-147.
5. Esp. squill (*Urginea maritima* [L.] Baker). Squills had a long history of association with Greek religious customs and magical lore. John Scarborough, "The Pharmacology of Sacred Plants, Herbs and Roots," in C. A. Faraone and D. Obbink, eds., *Accessing the Divine: Studies in Ancient Greek Magic and Religion* (Oxford, 1988 [in press]), esp. nn. 96-117. The medical and pharmacological uses of squill receive detailed analysis in Jerry Stannard, "Squill in Ancient and Medieval Materia Medica, with Special Reference to its Employment for Dropsy," *Bulletin of the New York Academy of Medicine* 50 (1974), 684-713.
6. Anthony Preus, "Theophrastus' Psychopharmacology

(*HP* IX)," preprint text of 16 April 1985 for distribution to participants in the London Theophrastus Conference.

7. John Scarborough, "Theophrastus on Herbals and Herbal Remedies," *Journal of the History of Biology* 11 (1978): 353-385.
8. *Ocimum basilicum* L., sweet basil. Cf. Theophrastus, *Enquiry into Plants*, VII, 7. 2.
9. *krataigonos* = the willow weed, or redleg, *Polygonum persicaria* L. Cf. Dioscorides, *Materia medica*, III, 124 (Max Wellmann, ed., *Pedanii Dioscuridis Anazarbei De materia medica* [Berlin, 1906-1914; 3 vols.; rptd. 1958), Vol. II, pp. 134-35).
10. Theophrastus, *Enquiry into Plants*, IX, 18. 6 (ed. Wimmer [n. 3], p. 160).
11. E.g. Dioscorides, III, 124 (ed. Wellmann [n. 9], Vol. II, pp. 134-135).
12. Theophrastus, *Enquiry into Plants*, IX, 18. 9 (ed. Wimmer [n. 3], pp. 160-161).
13 Scarborough, "Pharmacology of Sacred Plants" (n. 5), passim.
14. All arguments regarding the authorship of *Enquiry*, IX, were decisively settled by Benedict Einarson, "The Manuscripts of Theophrastus' *Historia Planatarum*," *Classical Philology* 71 (1976): 67-76. Book IX is by Theophrastus.
15. John Scarborough, *Facets of Hellenic Life* (Boston, 1976), ch. 7: "Proper Conduct and Sexual Mores," with sources and references.
16. "Other writers on agriculture are occasionally mentioned [by Theophrastus), but only when (like the philosophers) they were no longer living... It was good form not to mention a contemporary by name." Benedict Einarson and G.K.K. Link, eds. and trans., *Theophrastus De causis plantarum*, Vol. I [Bks. I-II] (London, 1976 [Loeb Classical Library]), pp. xix-xx.
17. Theophrastus, *Enquiry into Plants*, IX, 17. 2-3.
18. Full discussion of botanical, pharmacological, entomological, herpetological, etc. specifics (with identifications of species) in John Scarborough, "Nicander's Toxicology, I: Snakes," and "Nicander's Toxicology, II: Spiders, Scorpions, Insects and Myriapods," *Pharmacy in History* 19 (1977): 3-23, and 21 (1979): 3-34 and 73-92.
19. The best modern edition (with an English translation) is A. S. F. Gow and A. F. Scholfield, eds. and trans., *Nicander: The Poems and Poetical Fragments* (Cambridge, 1953).
20. Scarborough, "Nicander's Toxicology, II" (n. 18), 73-80, with nn. 239-325.
21. Otto Schneider, "Apollodorus iologorum dux" in *Nicandrea* (Leipzig, 1856), 181-201.
22. H. Beckh, ed., *Geoponica* (Leipzig, 1895).
23. The best modern edition (Greek text and commentary) is M. L. West, ed., *Hesiod: Works and Days* (Oxford, 1978).
24. John Scarborough, "Some Beetles in Pliny's Natural History," *Coleopterists Bulletin* 31 (1977): 293-296, and Scarborough, "Nicander's Toxicology, II" (n. 18), 74.
25. Snake bite remedies listed with discussion and identification in Scarborough, "Nicander's Toxicology, I" (n. 18), 10-17; kaolin as antidote in Scarborough, "Nicander's Toxicology, II" (n. 18), 77-78 with nn. 280-298.
26. John M. Riddle, *Dioscorides on Pharmacy and Medicine* (Austin, 1985), 176-180. Kurt Weitzmann, *Illustrations in Roll and Codex*, 2nd printing (Princeton, 1970), 47-80 ("The System of Illustration in the Classical Roll").
27. Most of the papyrus fragments classified as "medical" are devoted to drug lists and recipes, often identified by author. Marie-Hélène Marganne, *Inventaire analytique des papyrus grecs de médecine* (Geneva, 1981). One of the best introductions to Greek papyrology remains E. G. Turner, Greek Papyri (Oxford, 1968; rptd. 1980).
28. This is one of the major sub-themes in T. E. Lawrence's famous *Seven Pillars of Wisdom* (London, 1926; paperback rpt. New York, 1962), confirmed through personal experience by the present author in Jordan and Lebanon in 1968. See also Johannes Pedersen, *The Arabic Book*, trans. by G. French (Princeton, 1984), 7-11.
29. C. H. Roberts and T. C. Skeat, *The Birth of the Codex* (London, 1983).
30. E.g., E. A. Wallis Budge, ed. and trans., *Syrian Anatomy Pathology and Therapeutics or "The Book of Medicines"* (London, 1913; 2 vols.).
31. Karl Preisendanz, ed. and trans. [German], *Papyri Graecae Magicae: Die griechischen Zauberpapyri*, 2nd ed. Albert Henrichs (Leipzig, 1973-1974; 2 vols.), now available in English translations with clipped commentaries as Hans Dieter Betz, ed., *The Greek Magical Papyri in Translation Including the Demotic Spells, Vol. I: Texts* (Chicago, 1986). In further notes, the *Papyri Graecae Magicae* will be cited as *PGM*.
32. Scarborough, "Nicander's Toxicology, II" (n. 18) 4 with nn. 3-8.
33. The Scholia on Nicander's works have been collected and edited in various modern editions, with the most accessible being Marius Geymonat, ed., *Scholia in Nicandri Alexipharmaca* (Milan, 1974), and Annunciata Crugnola, ed., *Scholia in Nicandri Theriaka* (Milan, 1971).
34. Max Wellmann, "Das älteste Krauterbuch der Griechen" in *Festgabe für Franz Susemihl* (Leipzig, 1898), 1-31.
35. Cajus Fabricius, *Galens Exzerpte aus älteren Pharmakologen* (Berlin, 1972), 189-190.
36. Riddle, *Dioscorides* (n. 26), 94-131.
37. Dioscorides, l, 25 (ed. Wellmann [n. 9], Vol. I, pp. 28-29); translated with ingredients identified in John Scarborough, "Early Byzantine Pharmacology," *Dumbarton Oaks Papers* 38 (1984): 213-232 [230], and Riddle, *Dioscorides* (n. 26), 90.
38. Dioscorides, III, 80 (ed. Wellmann [n. 9], Vol. II, pp. 94-96); III, 80. 1-2 translated in John Scarborough, *Pharmacy's Ancient Heritage: Theophrastus, Nicander, and Dioscorides* (Lexington, Ky., 1985), 72-73.
39. Riddle, *Dioscorides* (n. 26), 94-98.
40. Dioscorides, Preface, 1-3 (ed. Wellmann [n. 9], Vol. I, pp. 1-2); translated by John Scarborough and Vivian Nutton, "The *Preface* of Dioscorides' *Materia Medica*: Introduction, Translation, Commentary," *Transactions and Studies of the College of Physicians*

of Philadelphia, n.s. 4 (1982): 187-227 [195-196].

41. Dioscorides, III, 23. 1 (ed. Wellmann [n. 9], Vol. II, p. 30).
42. Dioscorides, III, 23. 3-6 (ed. Wellmann [n. 9], Vol. II, pp. 31-32), trans. by present author. *Amorgē* is the watery part which runs out when olives are pressed.
43. The usual dates for Galen (A.D. 130-c. 200) have been proved wrong by the fundamental research of Vivian Nutton. See esp. Nutton's "The Chronology of Galen's Early Career," *Classical Quarterly,* n.s. 23 (1973): 158-171, and "Galen in the Eyes of his Contemporaries," *Bulletin of the History of Medicine* 58 (1984): 315-324. See also John Scarborough, "Galen and the Gladiators," *Episteme* 5 (1971): 98-111, and "The Galenic Question," *Sudhoffs Archiv* 65 (1981): 1-31.
44. Galen, *Properties and Mixtures of Simples*, VI, preface (in C. G. Kühn, ed., *Claudii Galeni Opera omnia* [Leipzig, 1821-1833; 20 vols. in 22 parts; rptd. Hildesheim, 1964-1965], Vol. XI, p, 797-798). John Scarborough, *Roman Medicine* (London, 1969; rptd. 1976), 128-130.
45. Scarborough, "Byzantine Pharmacology" (n. 37), 215-221.
46. This is Andromachus "the Younger." Fabricius, *Galens Exzerpie* (n. 35), 185-189.
47. John Scarborough, "Criton, Physician to Trajan: Historian and Pharmacist" in John W. Eadie and Josiah Ober, eds., *The Craft of the Ancient Historian: Essays in Honor of Chester G. Starr* (Lanham, Maryland, 1985), 387-405. Fabricius, *Galens Exzerpte* (n. 35), 190-192.
48. Fabricius lists seven "major sources" for Galen's pharmacology: Apollonius the Herophilean, Heras, Andromachus the Younger, Damocrates, Criton, Asclepiades the Pharmacist, and Archigenes. Fabricius, *Galens Exzerpte* (n. 35), 180-199.
49. Scarborough, "Byzantine Pharmacology" (n. 37), 218: e.g., Criton's drug books which quote extracts under the names of Archigenes, Cleopatra, and Archigenes.
50. Listed by Vivian Nutton, "The Drug Trade in Antiquity," *Journal of the Royal Society of Medicine* 78 (1985): 138-145 [145]. See also Scarborough, "Byzantine Pharmacology" (n. 37), 219 with n. 102.
51. Scarborough, "Criton" (n. 47), 395.
52. The *Seplasia* was a street or square (*platea*) in Capua, especially infamous as the place where fraudulent drug dealers sold their wares. Pliny, *Natural History*, XVI, 40-41 (fake frankincense made in the *Seplasia* from pine pitch), and XXXIV, 108 (the *Seplasia* provides ignorant doctors and patients alike with showy but worthless drugs, especially plasters and eye-salves). Cicero, *Against Piso*, 25, sarcastically notes the 'trade' of Seplasian ointment dealers (*unguentarii*) in rouge, hair-oil for men, and the like.
53. Nutton, "Drug Trade" (n. 50), 138-140.
54. Among many references, Galen, *Antidotes*, I, 2 (ed. Kiihn [n. 44], Vol. XIV, p. 9).
55. A. N. Sherwin-White, *The Roman Citizenship*, 2nd ed. (Oxford, 1973), 380-394. Peter Garnsey, *Social Status and Legal Privilege in the Roman Empire* (Oxford, 1970), 260-271.
56. Werner Krenkel, *Pompejanische Inschriften* (Heidelberg, 1963), passim.
57. Naphtali Lewis, *Greeks in Ptolemaic Egypt* (Oxford, 1986), 66, 74-76, and 122-123. Turner, *Greek Papyri* (n. 27), 48-51. Naphtali Lewis, *Life in Egypt under Roman Rule* (Oxford, 1983), 59-64 and 81-82.
58. Nicely illustrated by the texts assembled and translated by Georg Luck, *Arcana Mundi: Magic and the Occult in the Greek and Roman Worlds* (Baltimore, 1985); the classic work on the topic is Lynn Thorndike, *A History of Magic and Experimental Science*, Vol. I (New York, 1923), esp. pp. 39-547. Still definitive is A. Bouché-Leclercq, *L'astrologie grecque* (Paris, 1899; rptd. Brussels, 1963), and the grand intermixture of magic and science in Greek thinking is well explicated in G.E.R. Lloyd, *Magic, Reason and Experience* (Cambridge, ·1979).
59. Scarborough, *Roman Medicine* (n. 44), 119-120 with refs.
60. Galen, *Simples*, VI preface (ed. Kühn [n. 44], Vol. XI, p. 792) characterises the *On Plants* by a certain Pamphilus as chock-full of "Egyptian nonsense." Pamphilus (*fl.* c. A.D. 100) is clearly linked with Hermetic lore in Egypt. Garth Fowden, *The Egyptian Hermes* (Cambridge, 1986), 161.
61. Scarborough, "Pharmacology of Sacred Plants" (n. 5), with nn. 185-220.
62. Fowden, *Egyptian Hermes* (n. 60), 162-165. Jonathan Z. Smith, *Map Is Not Territory* (Leiden, 1978), 172-189.
63. G.E.R. Lloyd, *Science and Morality in Greco-Roman Antiquity* (Cambridge, 1985 [pamphlet of 29 pp.]).
64. ed. Preisendanz and Henrichs, with English trans., ed. Betz (n. 31).
65. F. Boll, *et al.*, eds., *Catalogus Codicum Astrologorum Graecorum* (Brussels, 1898.1953; 12 vols. in 20 parts).
66. John Scarborough, "Hermetic and Related Texts in Classical Antiquity" in Allen G. Debus and Ingrid Merkel, eds., *Renaissance Transition: Essays in Memory of Frances A. Yates* (Cranbury, New Jersey, 1987 [in press]). The standard edition of the Greek and Latin 'Hermetic' texts is A. D. Nock and A.-J. Festugière, eds. and trans. [French], *Corpus Hermeticum* (Paris, 1946-1954; 4 vols., rptd. 1983 [title pages bear the title Corpus Hermeticum, but the covers read Hermès Trismégiste]).
67. Hans-Viet Friedrich, ed., *Thessalos von Tralles: griechisch und lateinisch* (Meisenheim am Glan, 1968). A translation with commentary of Thessalus' *Powers of Herbs*, II, 1 (ed. Friedrich, pp. 199 and 203) by the present author appears in "Pharmacology of Sacred Plants" (n. 5), with nn. 199-215.
68. Scarborough, "Byzantine Pharmacology" (n. 37), 229-232.
69. Riddle, *Dioscorides* (n. 26), 90. Scarborough, "Byzantine Pharmacology" (n. 37), 231 with n. 212.
70. Manetho's work was titled *Preparation of Kyphi-Recipes*. Scarborough, "Byzantine Pharmacology" (n. 37), 231 with nn. 210-211.
71. Manetho's *Aegyptiaca* survives only in quoted Greek excerpts, fragments, and translated epitomes in Armenian, collected and translated by W. G. Waddell, *Manetho* (London, 1940 [Loeb Classical Library]), pp. 1-187.
72. n. 37 above.

73. *PGM* (n. 31), IV, 1313; IV, 2971; V, 221; VII, 538; VII, 873 = translated passages in Betz, ed., *Magical Papyri* (n. 31), 63, 95, 204, 133, and 141.
74. Plutarch, *Moralia: Isis and Osiris*, 383E(80)-384C.
75. Galen, *Antidotes*, II, 2 (ed. Kuhn [n. 44], Vol. XIV, pp. 117-119).
76. Oribasius, *Synopsis for Eustathius*, III, 220 (in J. Raeder, ed., *Oribasii Synopsis ad Eustathium. Libri ad Eunapium* [Leipzig, 1926; *Corpus Medicorum Graecorum* VI 3], p. 121).
77. Paul of Aegina, VII, 22. 5 (in I. L. Heiberg, ed., *Paulus Aegineta* [Leipzig, 1921-1924; 2 vols.; *Corpus Medicorum Graecorum* IX 1 and 2], Vol. II, p. 394). Full discussion of Paul's "lunar incense-salve" (28 ingredients) with keying of species in Scarborough, "Byzantine Pharmacology" (n. 37), 231.
78. Paul of Aegina, VII, 22. 1 (ed. Heiberg [n. 77], Vol. II, p. 393).

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